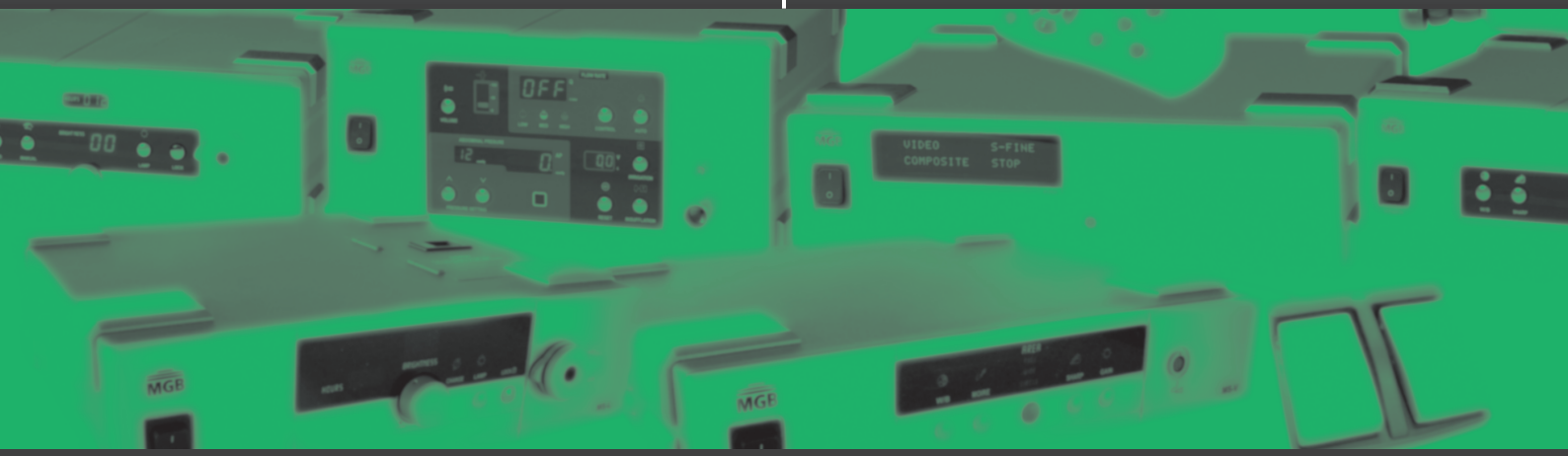
VIDEO-SYSTEMS

ILLUMINATION INSUFFLATION DOCUMENTATION



www.mgb-berlin.de

MGB

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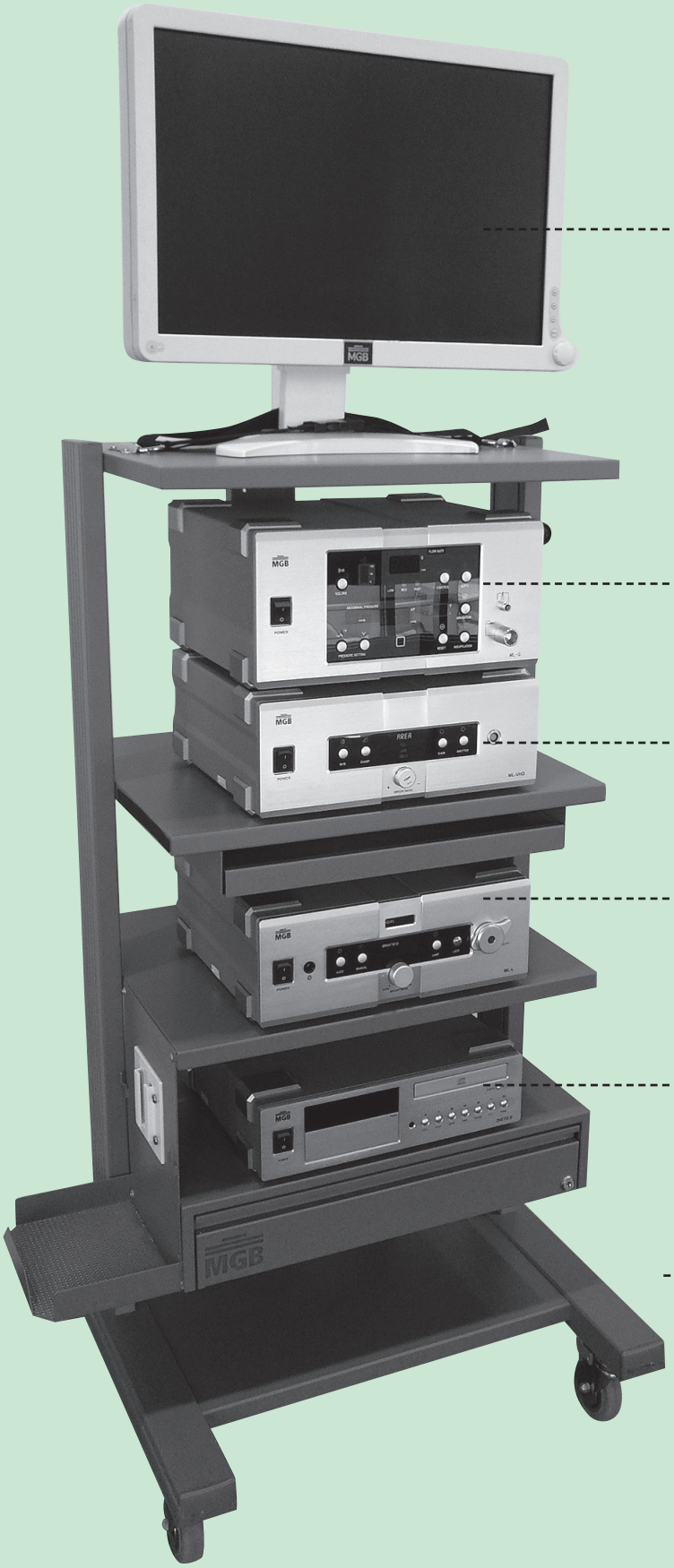


MGB 24″ HD-Monitor
Flat Screen

MGB ML-G
Insufflator

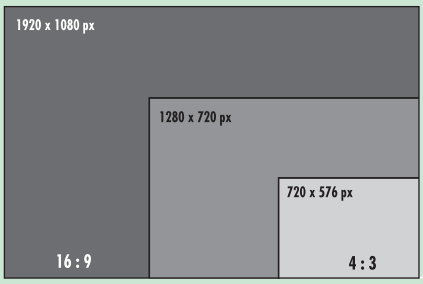
MGB ML-VHD
3 CCD HD-Endo-Camera

MGB ML-L
Light Source 300 W Xenon

MGB Disto II
Video-Documentation

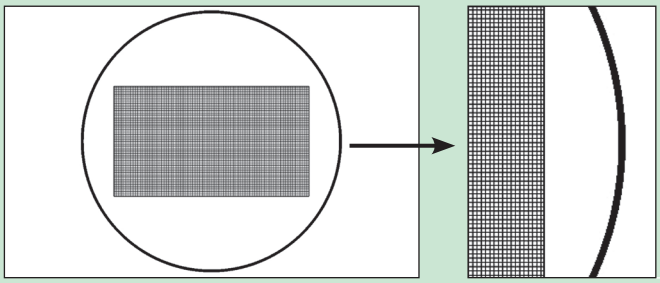
EC-2000 A
Endo-Cart

HD TECHNOLOGY CORE COMPETENCES



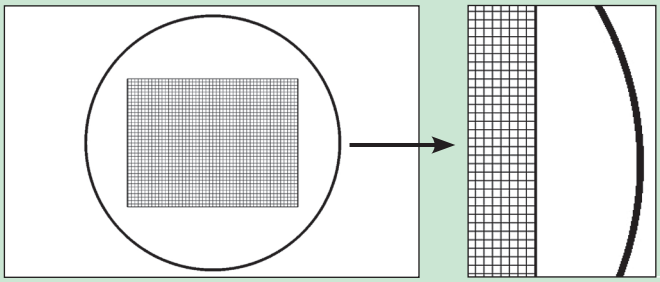
MGB's ML-VHD is using a high end broadcast HD 3 CCD image sensor with 5 times more pixel than standard CCD image sensors for PAL or NTSC format. The HD format is specified with 16:9 instead of PAL or NTSC standard 4:3.

MGB's ML-VHD is using a 1/3" CCD image sensor. The resulting pixel size is larger than pixels of PAL or NTSC 1/3" CCD image sensors. It allows perfect imaging of micro structures.

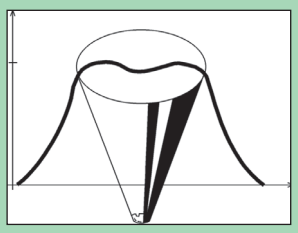


MGB's HD telescopes as well as HD video camera lenses are designed to transmit high resolution images.

The magnification is especially adopted for full frame images on 16:9 monitors.



Standard PAL or NTSC images have less resolution, less field of view in horizontal but larger field of view in vertical direction.

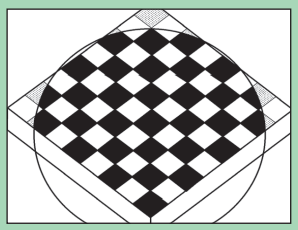


- Homogenous brightness
- Perfect illumination

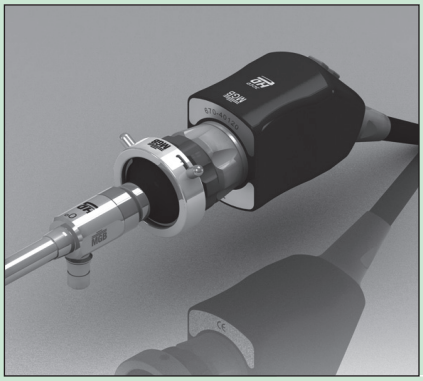
Some manufacturers of endoscopy video camera systems are using a 4:3 format CCD image sensor or a 16:9 format image sensor with less resolution than MGB's ML-VHD camera with 1920 H x 1080 V pixels. Such cameras using so called "pixel shifting" or "up scaling" technology, a digital interpolation process in order to provide HD compatible video signal at output (HDMI, HD-SDI).

MGB is using a 3 x CCD image sensor with real 1920 H x 1080 V pixel. The high end image sensor guarantees brilliant natural HD imaging without any digital manipulation – the real natural HD!

MGB's ML-VHD is using high speed digital signal processing (DSP). This ensures perfect image quality and natural image colors in combination with MGB's HD telescopes and video camera lenses.



- High resolution
- Low distortion
- Brilliant contrast



Camera – Zoom – Telescope

MGB's ML-VHD and optics are perfect adjusted to each other. The HD system performs brilliant and precise colors.

ML-VHD Camera head and HD camera zoom lens has optimized weight balanced and ergonomic design for tireless working.

For HD-Video Camera Lens please refer to page 16.

ML-VHD 3 CCD HD ENDO-CAMERA

Order-No.: 670 -41100 (50 Hz)
670 -41200 (60 Hz)

NEW

Specification

- 3 CCD HD Camera, 1/3" technology: full HDTV 1920 x 1080
- Full automatic control with digital signal processing
- Simple and intelligent key-function
- Automatic white balance control with **OSD** (**O**n **S**creen **D**isplay)
- Horizontal 1920 TV lines (HD-TV)
- Waterproof Camera-Head
- Ergonomic Head-Design
- Digital output: 2 x HD-SDI / 1 x HDMI / 1 x DVI-D
- Analog output: 1 x Composite / 1 x S-Video

Order-No.	
670-41100	ML-VHD (PAL), 100-230 V
670-41200	ML-VHD (NTSC), 100-230 V
Main Connection	
Power supply	~100-120 VAC/~200-230 VAC
Frequency	50-60 Hz
Power consumption	70 VA (max.)
Fuse	T 2.0/250 VAC
Classification	
Safety class	1 with potential equalization
Protection	connection
Type	IPX1 (console)
Approval	CE
Dimension and Weight	
Dimension (w/h/d)	380 x 150 x 340 mm
Weight	7.4 kg
Operating Conditions	
Operating temperature	+10° C ~ +40° C
Operating humidity	30 % ~ 75 %
Extent of Delivery	
ML-VHD	■ Power cable ■ User manual ■ HD-SDI cable ■ HDMI cable ■ DVI cable ■ HDMI cable to DVI Gender ■ S-Video cable ■ Composite cable (1.5 m)
Interfaces	
ML-VHD	■ 2 x HD-SDI ■ 1 x YPbPr ■ 1 x HDMI ■ 1 x DVI-D ■ 1 x remote ■ 1 x composite ■ 1 x S-Video

Main Unit	
Resolution (Pixel)	1920 (H) x 1080 (V)
Min. of illumination	13 Lux (F2.2, Sensitivity + 18 dB)
Automatic gain control	18 dB
Manual gain control	Yes
Shutter speed control	Automatic [1/100 ~ 1/50,000s]
Image sensor CCD	1/3 " Interline CCD 3x16:9
White balance	■ Automatic adjustment ■ Screen display confirmation
Brightness control	Area selecting control
Sharpness	Enhancement by set button
CCD Camera-Head	
Head-dimension (w/h/d)	35 x 48 x 65 mm
Head-weight	134 g (incl. cable 3m)
Lens connection	C-mount
Waterproof	IP X 7
2 Head buttons (1 x selec-	**Button A:** "AWB" **Button B:** "print out", "Gain", "Reflection"

MGB

ML-V 3 CCD ENDO-CAMERA

Order-No. 670-31430

Specification

- 3 CCD Camera, 1/3" technology
- Full automatic control with digital signal processing
- Simple and intelligent key-function
- Automatic white balance control with **OSD** (**O**n **S**creen **D**isplay)
- Horizontal 750 TV lines
- Waterproof Camera-Head
- Ergonomic Head-Design

Intended Use

The Endoscopic Camera *ML-V* is intended to attach to standard endoscopes to permit visualization of body cavities, hollow organs and canals during endoscopic procedures. The endoscopic image can be displayed on any standard medical video monitor.
The preselected area will always guarantee a brilliant image in combination with different kind of endoscopes, beeing used in various endoscopic application.

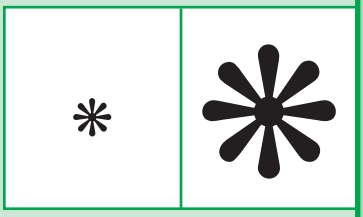
ZOOM coupler optional.

3 CCD Camera-Head

With optical zoom.
f = 16 - 34 mm
(Order-No.: 470-28000)

Camera-Head

Two Head Buttons:
A: Remote
B: W/B, Gain, Zoom



Digital Zoom

Allows to enlarge part of the picture with standard video camera lens.

GENERAL

Order-No.	
670-31430	ML-V (PAL), 100 - 230 V
670-32430	ML-V (NTSC), 100 - 230 V
Main Connection	
Power supply	~100 -120 VAC/~200 - 230 VAC
Frequency	50 - 60 Hz
Power consumption	55 VA (max.)
Fuse	2 x 1.0 AL / 250 V (IEC 127)
Classification	
Safety class	1 with potential equalization
Protection	connection
Type	IPX 1 (console)
Approval	CE
Dimension and Weight	
Dimension (w/h/d)	380 x 120 x 340 mm
Weight	7.4 kg
Operating Conditions	
Operating temperature	+10° C ~ +40° C
Operating humidity	30 % ~ 75 %
Extent of Delivery	
ML-V	■ S-VHS cable ■ BNC cable ■ RGB cable ■ Power cable ■ User manual
Interface	
ML-V	■ 1 x RGB ■ 2 x Y/C (S-VHS) ■ 2 x composit (BNC) ■ 1 x remote

SPECIFICATION

Main Unit	
Resolution	Horizontal 750 TV Lines
SNR	63 dB Standard
Min. of illumination	14 Lux (F2.2, gain 15 dB, 3000K)
Automatic gain control	15 dB
Manual gain control	Font panel [1/50,000 s]
Shutter speed control	Automatic [1/60]
Image sensor CCD	1/3 " Interline CCD x 3
Pixel	PAL: 752 x 582 (h x v) x 3 NTSC: 768 x 494 (h x v) x 3
White balance	Automatic adjustment (Set button) on screen display confirmation
Brightness control	
Sharpness	Area selecting control
Digital zoom	Set button
CCD Camera-Head	
Head-dimension (w/h/d)	35 x 48 x 65 mm
Head-weight	134 g (incl. cable 3 m)
Lens connection	C-mount
Waterproof	IP X 7
2 Head buttons (1 x selec-	**Button A:** "print" **Button B:** "W/B", "Gain",

Order-No.	*Accessories*
	Video Camera Zoom Lens
470-28000	ZOOM f = 16 - 34 mm, C-mount
	Video Camera Lens
470-23400	f = 18 mm, C-mount, circular frame picture
470-27400	f = 22 mm, C-mount, limited frame picture
470-24400	f = 25 mm, C-mount, full frame picture
470-25400	f = 30 mm, C-mount, full frame picture
470-26400	f = 40 mm, C-mount, full frame picture
	Urology Video Camera Lens 90°
470-30000	f = 18 mm, C-mount, circular frame picture

MGB

MS-V 1 CCD ENDO-CAMERA

Order-No. 670-15000

Higher Contrast

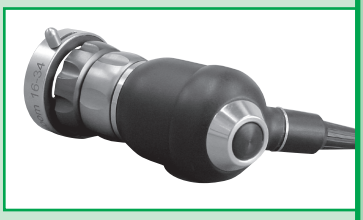
The Endo-Camera MS-V can provide an enhanced resolution. Even fine tissue structures can be visualized with its detailed transmission.

Camera Head-Design

The Endo-Camera *MS-V* is specially designed for endoscopic procedures. The angled camera-head gives a perfect sense of up and down to the user. The new camera is much lighter and smaller. The head button is individual selectable.

White Balance Memory Function

The white balance setting is stored in the camera's micro-processor. Thus, the correct adjustment is kept even if the Endo-Camera *MS-V* is switched off.



Head Button

Individual selectable head button:
"W/B", "Print" and "Gain"
(switch on the backside).

Moiré Function

Allows to use flexible Fibrescopes.

Freeze *Screen Splitting*

Freeze and Screen Splitting (optional)

MS-V allows – controlled by a footswitch – **freeze** and **screen splitting** on the monitor for detailed comparison.

MGB

GENERAL

Order-No.	*MS-V – Standard-Version*
670-15000	MS-V (PAL), 100-230 V
670-16000	MS-V (NTSC), 100-230 V
	MS-V – Freeze-Version
670-15010	MS-V (PAL), 100-230 V
670-16010	MS-V (NTSC), 100-230 V
Main Connection	
Power supply	~100 - 120 VAC/~200 - 230 VAC
Frequency	50/60 Hz
Power consumption	50 VA (max.)
Fuse (~100 -120 V)	2 x T 2.0 AL/250 V (IEC 127)
Fuse (~200 -240 V)	2 x T 1.0 AL/250 V (IEC 127)
Classification	
Safety class	1 with potential equalization connection
Protection	IP X 1
Safety-class	BF
Approval	CE
Dimension and Weight	
Dimension (w/h/d)	380 x 70 x 340 mm
Weight	8.0 kg
Operating Conditions	
Operating temperature	+10° C ~ +40° C
Operating humidity	30 % ~ 75 %
Extent of Delivery	
MS-V	■ S-VHS cable ■ Power cable ■ BNC cable ■ User manual ■ RGB cable
Interface	
MS-V Standard-Version	■ 2 x composit (BNC) ■ 2x Y/C (S-VHS) ■ 1 x remote
MS-V Freeze-Version	Additional: ■ 1 x RGB ■ 1 x foot-pedal for freeze connector

SPECIFICATION

CCD Camera Unit	
CCD-Sensor size	1/3 "
NTSC (h x v)	768 x 494/410.000 pixels
PAL (h x v)	752 x 582/440.000 pixels
Sensitivity	1.5 Lux
Shutter speed	Automatic control
CCD Camera-Head	
Head-dimension (d/l)	38 x 52 mm
Head-weight	250 g (with cable)
Lens connection	C-mount
Waterproof	IP X 7
1 Head button selectable	"W/B" or "Print" or "Window"

Order-No.	*Accessories*
	Video Camera Zoom Lens
470-28000	ZOOM f = 16 - 34 mm, C-mount
	Video Camera Lens
470-23400	f = 18 mm, C-mount, circular frame picture
470-27400	f = 22 mm, C-mount, limited frame picture
470-24400	f = 25 mm, C-mount, full frame picture
470-25400	f = 30 mm, C-mount, full frame picture
470-26400	f = 40 mm, C-mount, full frame picture
	Urology Video Camera Lens 90°
470-30000	f = 18 mm, C-mount, circular frame picture

ELICA II: VIDEO-CAMERA COMBINED WITH DUO LIGHT-SOURCE

Order-No. 670-51500

Higher Contrast

The Endo-Camera *ELICA II* can provide an enhanced resolution. Even fine tissue structures can be visualized with its detailed transmission.

Great Light Sensitivity

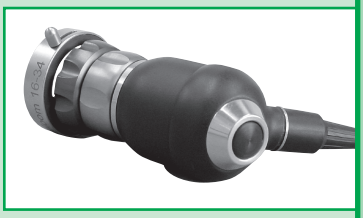
Under difficult light conditions the Endo-Camera *ELICA II* is showing a well illuminated picture. For small diameter telescope's digital filters allow to enhance the sharpness.

New Camera-Head-Design

The Endo-Camera *ELICA II* is specially designed for endoscopic procedures. The angled camera-head gives a perfect sense of up and down to the user.

White Balance Memory Function

The white balance setting is stored in the camera's micro-processor. Thus, the correct adjustment is kept even if the Endo-Camera *ELICA II* is switched off.

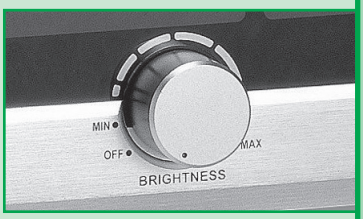


Head Button

Individual selectable head button:
- "W/B": White balance
- "Print": Remote to recorder device
- "Sharp": Sharpness (switch on the backside).

Moiré Function

Allows to use flexible Fibrescopes.



Brightness

Light-intensity regulation.

Freeze *Screen Splitting*

Freeze and Screen Splitting (optional)

ELICA II allows **freeze** and **screen splitting** on the monitor for detailed comparison.

GENERAL

Order-No.	*ELICA II – Standard-Version*
670-51500	ELICA II (PAL), 100-230 V
670-52500	ELICA II (NTSC), 100-230 V
	ELICA II – Freeze-Version
670-51510	ELICA II (PAL), 100-230 V
670-52510	ELICA II (NTSC), 100-230 V
Main Connection	
Power supply	~100-120 VAC/~200-230 VAC
Frequency	50/60 Hz
Power consumption	400 VA
Fuse	2 x T 3.15 L/250 V (IEC 127)
Classification	
Safety class	1 with potential equalization connection
Protection	IP X 1
Type	BF
Approval	CE
Dimension and Weight	
Dimension (w/h/d)	350 x 400 x 140 mm
Weight	12.0 kg
Operating Conditions	
Operating temperature	+10° C ~ +40° C
Operating humidity	30 % ~ 75 %
Extent of Delivery	
ELICA II	■ S-VHS cable ■ Power cable ■ BNC cable ■ User manual
Interfaces	
ELICA II Standard-Version	■ 2 x composit (BNC) ■ 2x Y/C (S-VHS) ■ 1 x remote
ELICA II Freeze-Version	Additional: ■ 1 x foot-pedal for freeze connector

SPECIFICATION

ELICA Camera Unit	
CCD-Sensor size	1/3 "
NTSC (h x v)	768 x 494/410.000 pixels
PAL (h x v)	752 x 582/440.000 pixels
Sensitivity	1.5 Lux
Shutter speed	Automatic control
CCD Camera-Head	
Head-dimension (d/l)	38 x 52 mm
Head-weight	250 g (with cable)
Lens connection	C-mount
Waterproof	IP X 7
1 Head button selectable	"W/B" or "Print" or "Sharp"
ELICA Light Source Unit	
HALOGEN Lamp	2 x 250 W
Color temperature	3.500 K
Life cycle of the lamp	50 h
Light output	Regulation
Light guide port	1 x universal light guide port 1 x MGB/Wolf

Order-No.	*Accessories*
	Video Camera Zoom Lens
470-28000	ZOOM f = 16-34 mm, C-mount
	Video Camera Lens
470-23400	f = 18 mm, C-mount, circular frame picture
470-27400	f = 22 mm, C-mount, limited frame picture
470-24400	f = 25 mm, C-mount, full frame picture
470-25400	f = 30 mm, C-mount, full frame picture
470-26400	f = 40 mm, C-mount, full frame picture
	Urology Video Camera Lens 90°
470-30000	f = 18 mm, C-mount, circular frame picture

FENCER:
THE COMPLETE LAPAROSCOPIC UNIT

Order-No. 675-11000

FOUR IN ONE

- ***Gas-Insufflator***
- ***Video-Camera***
- ***Light Source***
- ***Irrigator***

FENCER is a complete laparoscopic system. A combination of:

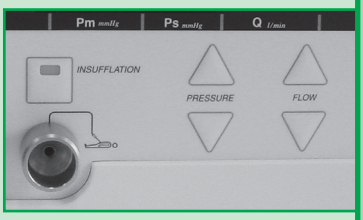
- Insufflator
- CCD Video-Camera
- Xenon-Light Source
- Irrigation

in one compact unit.

Each function working independently from the other. *FENCER* allows high performance for laparoscopic applications. Additionally, *FENCER* is designed for simple and user friendly operation.

Gas-Insufflator

The 30 l-Insufflation part in *FENCER* is equipped with a precise electronical control for an optimal intra-abdominal working pressure. This allows exact working. Three selectable Flow rates of 1, 5, 8 and 30 l/min are available for the exact control of the Insufflator.



Gas-Insufflator

High Resolution Camera by Digital Controlling

FENCER is based on the latest digital technology. The microprocessor controls brightness through shutter control and white balance that result in clear and sharp images for endoscopy everytime.

Video-Camera

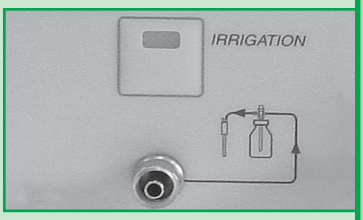
Xenon Light Source with Manual Regulation

The 180 W Xenon Light Source provide illumination. The natural light – composed of the entire spectrum of white light – is the optimum for laparoscopic surgery. Users can replace lamps quickly and easily.

Light Source

Irrigation

The Irrigation part in *FENCER* has a high pressure Irrigation function. In combination with the MGB-Suction-/Irrigation instruments and easy handling, high flow Irrigation is guaranteed and constant.



Irrigation

MGB

GENERAL

Order-No.	*FENCER-Versions*
675-11000	FENCER (PAL), 200-230 V
675-11001	FENCER (PAL), 100-120 V
675-12000	FENCER (NTSC), 200-230 V
675-12001	FENCER (NTSC), 100-120 V
Main Connection	
Power supply	~100 - 120 VAC/~200 - 230 VAC
Frequency	50/60 Hz
Power consumption	350 VA (max.)
Fuse	2 x T3.15 A (250 V)/2 x 6.3 A (110 V)
Classification	
Safety class	1 Type BF
Type	BF
Approval	CE
Dimension and Weight	
Dimension (w/h/d)	530 x 200 x 440 mm
Weight	18.0 kg
Extent of Delivery	
FENCER (PAL- or NTSC-type)	■ Camera-head, incl. cable ■ Silicon-tube for Insufflator ■ Silicon-tube for Irrigator ■ Regulator with manometer and snap-in-connector ■ Power-supply cable and BNC-cable
Light Source 180 W XENON	
Lamp type	Xenon 180 W
Lamp color temperature	Approx. 6000 K
Lamp replacement	Side door, with cartridge
Life-cycle of lamp	Approx. 500 hours
Manual regulation	
Irrigation	
Pressure	800 mbar
Insufflator 30 l	
Flow rate	■ ~ 30 L/min. (maximum) ■ 1.5 L/min. (minimum)
Insufflation pressure	1-30 mm Hg
Gas connection	MGB snap-in/DIN
Gas input pressure	4-10 bar/high pressure (pressure reducer included)

SPECIFICATION

FENCER Camera Unit	
CCD-Sensor	Size: 1/3 ″
NTSC (H X V)	768 x 494/410.000 pixels
PAL (H X V)	762 x 582/440.000 pixels
Sensitivity	1.5 Lux
Shutter speed	Automatic control between: 1/60-1/100.000 sec. (NTSC), 1/50-1/100.000 sec. (PAL)
Waterproof	IP X 7
Horizontal resolution	450 TV-lines
Signal output	Y/C (S-video) x 1 at 75 Ω composite x 1 at 75 Ω
Lens connection	C-mount
Camera-head size (d x l)	38 x 45 mm
Camera-head cable length	2.5 m
Camera-head weight	250 g, incl. cable

Order-No.	*Accessories*
	Video Camera Zoom Lens
470-28000	ZOOM f = 16-34 mm, C-mount
	Video Camera Lens
470-23400	f = 18 mm, C-mount, circular frame picture
470-27400	f = 22 mm, C-mount, limited frame picture
470-24400	f = 25 mm, C-mount, full frame picture
470-25400	f = 30 mm, C-mount, full frame picture
470-26400	f = 40 mm, C-mount, full frame picture
	Urology Video Camera Lens 90°
470-30000	f = 18 mm, C-mount, circular frame picture
402-11300	Light guide (for example): Ø 4.8 mm, length 2.3 m
686-00200	Spare lamp Xenon (180 W)
675-11203	Filter for insufflation, conus 15 mm, 25 pcs.
670-95300	Silicone-tube set for Insufflation
675-95301	Silicone-tube set for Irrigation
675-11202	Adapter for Insufflation

MGB

VIDEO CAMERA LENS

Video Camera Zoom Lens

■ f = 16 - 34 mm

HD-Video Camera Zoom Lens

■ f = 18 - 28 mm

Video Camera Lens

■ f = 18 mm (used in Arthroscopy, Urology, ENT)

■ f = 22 mm (used in ENT)

■ f = 25 mm (used in Laparoscopy)

■ f = 30 mm

■ f = 40 mm

HD-Video Camera Lens

■ f = 25 mm

Urology Video Camera Lens 90°

■ f = 18 mm

MGB

GENERAL

SPECIFICATION

Order-No.	Video Camera Zoom Lens
470-28000	f = 16-34 mm
Order-No.	**HD - Video Camera Zoom Lens**
470-29000	f = 18-28 mm

Video Camera Zoom Lens	
f = 16 - 34 mm	■ Zoom ■ C-mount ■ Used in all endoscopic fields (parafocal) ■ One of the shortest and very light-weight zoom in the market
HD - Video Camera Zoom Lens	
f = 18 - 28 mm	■ Zoom ■ HD resolution ■ C-mount

Order-No.	Video Camera Lens
470-23400	f = 18 mm
470-27400	f = 22 mm
470-24400	f = 25 mm
470-25400	f = 30 mm
470-26400	f = 40 mm
	HD - Video Camera Lens
470-24450	f = 25 mm

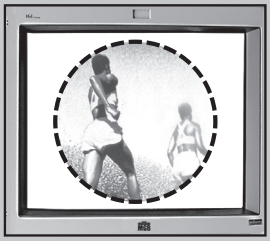
Video Camera Lens	
f = 18 mm f = 22 mm f = 25 mm f = 30 mm f = 40 mm	■ Brilliant optic ■ High translucence ■ Quick endoscope coupling ■ Waterproof ■ C-mount ■ Ergonomic design
HD - Video Camera Lens	
f = 25 mm	■ HD resolution ■ C-mount ■ Full frame picture with HD-Lapalux

Order-No.	Urology Video Camera Lens 90°
470-30000	f = 18 mm

Urology Video Camera Lens 90°	
f = 18 mm	■ Angled video lens with rotatable eyepiece-connector ■ Rotation lockable ■ Focal length f = 18 mm, circular frame picture ■ Connection to camera-head C-mount ■ One-hand operation ■ Air ventilation on ocular window ■ Soakable

Laparoscopy (Full Size)
with 1/3 " CCD/f = 25 mm

Limited Size
Sinoscopy Ø 4 mm/f = 22 mm



Arthroscopy/Urology (Circle Size)
Arthroscopy Ø 4 mm/f = 18 mm

MGB

ML-L

Order-No. 685-00400

300 W Xenon (150 W Halogen)

Natural Illumination

300 W Xenon light sources provide illumination in daylight quality. The natural light – composed of the entire spectrum of white light – is the optimum for endoscopic surgery.

Automatic Light Adjustment

In combination with the camera the *ML - L* continually optimises the brightness for viewing flat and deep structures inside the body. The brightness may also be adjusted manually.

Lamp Exchange

The lamp has an average life of 500 hours. A counter is situated on the front display. With integrated replacement indicator & 3 integrated silent fans control the temperature stability.

Safety Operation

The 300 W Xenon lamp and the 150 W Halogen lamp for emergency guarantee safe operation.

Universal Light Guide Connector Port

The universal light guide connector port allows the use of different light guides without paying any attention for having the right adapter.

Emergency Lamp

An integrated, unique 150 Watt emergency lamp for backup.

User Friendly Display

The *ML - L* control panel is robust, clearly and ergonomically arranged.

MGB

GENERAL

Order-No.	
685-00400	ML-L Light source
Main Connection	
Power supply	~100 - 120 VAC/~200 - 230 VAC
Frequency	50-60 Hz
Power consumption	500 VA (max.)
Fuse	2 x T 6.3 AL / 250 V (IEC 127)
Classification	
Safety class	1 with potential equalization connection
Protection	IP X 1
Type	BF
Approval	CE
Dimension and Weight	
Dimension (w/h/d)	400 x 160 x 360 mm
Weight	13.9 kg
Operating temperature	+10° C ~ +40° C
Operating humidity	30 % ~ 75 %
Operating Conditions	
Operating temperature	+10° C ~ +40° C
Operating humidity	30 % ~ 75 %
Extent of Delivery	
ML-L	■ Power cable ■ User manual
Interface to Camera	
ML-L	Video-input: composit (BNC)

SPECIFICATION

Main Lamp	
Xenon short arc lamp	300 W
Colour temperature	6.000 K
Life cycle of the lamp	Average 500 h
Light output	Regulation
Counter for operating hours	Front display
Replacement indicator	Front display
Emergency Lamp	
Halogen	150 W
Colour temperature	Appr. 3.600 K
Life cycle of the lamp	500 h

Order-No.	*Accessories*
685-00200	Spare lamp 300 W Xenon
681-00100	Spare lamp 150 W Halogen
402-11410	High performance light guide, LG 310 W, length 2.3 m
402-11510	High performance light guide, LG 310 W, length 3.0 m
KE 363159	Potential equalization cable, 1 m

MS-L LIGHT SOURCE 180 W

Order-No. 686-10000

Natural Illumination

180 W Xenon light sources provide illumination in daylight quality. The natural light – composed of the entire spectrum of white light – is the optimum for endoscopic surgery.

Xenon Lamp

The lamp has an average life of 500 hours. A counter is situated on the front display.

Light Regulation

Manual light regulation provides exact illumination control.

User Friendly Display

The *MS-L* control panel is robust and clearly arranged. Simple controls allow effective cleaning.

Lamp Exchange

The lamp has an average life of 500 hours. A counter is situated on the display. With integrated replacement indicator: 3 integrated silent fans control the temperature stability.

Universal Light Guide Connector Port

The universal light guide connector port allows the use of different light guides without paying any attention for having the right adapter.

Replacement Indicator

Light Regulation

Manual light regulation provides exact illumination control.

MGB

GENERAL

Order-No.	
686-10000	MS-L Light source
Main Connection	
Power supply	~100 - 120 VAC/~200 - 230 VAC
Frequency	50/60 Hz
Power consumption	300 VA
Fuse	2 x (T 3.15 AL / 250)
Classification	
Safety class	1 with potential equalization connection
Protection	IP X 1
Type	BF
Approval	CE
Dimension and Weight	
Dimension (w/h/d)	395 x 120 x 340 mm
Weight	10.0 kg
Operating Conditions	
Operating temperature	+10° C ~ +40° C
Operating humidity	30 % ~ 75 %
Extent of Delivery	
MS-L	■ Power cable ■ User manual

SPECIFICATION

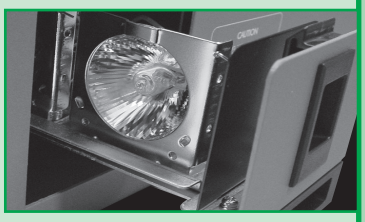
Main Unit	
Xenon Lamp	180 W
Color temperature	6.000 K
Life cycle of the lamp	500 h
Light output	Regulation
Counter for operating hours	Front display
Replacement indicator	Front display
Light guide connection	Universal

Order-No.	*Accessories*
686-00200	Spare lamp Xenon, 180 W
402-11300	Light guide, Ø 4.8 mm, length 2.3 m
402-11100	Light guide, Ø 4.8 mm, length 3.0 m
402-11410	High performance light guide, LG 310 W, length 2.3 m
402-11510	High performance light guide, LG 310 W, length 3.0 m
KE 363159	Potential equalization cable, 1 m

MGB

MS-LH LIGHT SOURCE

Order-No. 682-00010



Lamp Exchange

Drawer on the side.

Illumination

The light source *MS-LH* provides halogen light at a lamp output of 250 W. The extremely high luminous efficiency which is unusual for 250 W light sources is obtained by excellent tuning.

Consistent Light Quality

The light source *MS-LH* is designed with a built-in 250 W halogen spare light bulb. In case of a lamp defect, this allows to proceed with the endoscopic intervention.

Intended Use

The light source *MS-LH* provides illumination for fiberoptic endoscopy to gastroenterological and urological cavities, hollow organs and canals.

Lamp Quick Exchanger

Can easiliy done by side-drawer.

MGB

GENERAL

Order-No.	
682-00010	MS-LH
Main Connection	
Power supply	~100 - 120 VAC/~200 - 230 VAC
Frequency	50/60 Hz
Power consumption	400 VA
Fuse	2 x T 4.0 AL/250 V (IEC 127)
Classification	
Safety class	1 with potential equalization connection
Protection	IP X 1
Type	BF
Approval	CE
Dimension and Weight	
Dimension (w/h/d)	350 x 145 x 400 mm
Weight	10.0 kg
Extent of Delivery	
MS-LH	■ Power cable ■ User manual ■ 2 spare lamps (250 W Halogen) ■ 2 spare fuses

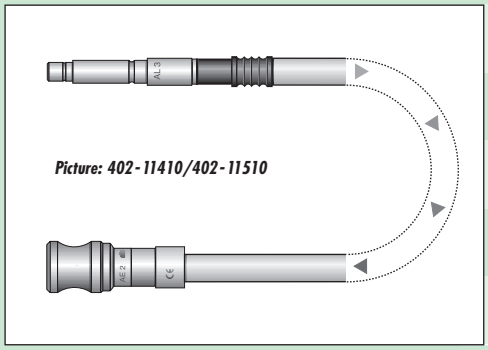
SPECIFICATION

Characteristics	
Lamp	2 x Halogen reflect lamp 250 W
Colour temperature	3.250 K
Life cycle of the lamp	50 h
Light port	Storz compatible

Order-No.	*Accessories*
402-11300	Light guide cable, Ø 4.8 mm, length 2.3 mm
402-11100	Light guide cable, Ø 4.8 mm, length 3.0 mm
682-00100	Spare lamp 250 W Halogen
KE 363159	Cable, 1 m, for potential equalization

MGB

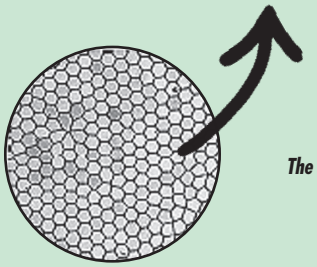
HIGH PERFORMANCE LIGHT GUIDE LG 310 W



Picture: 402-11410/402-11510

Product	*Order-No.*	*Length*	*Cable*	*AE (Adapter endoscope side)*	*AL (Adapter light source side)*
	402-11410	2.3 m	Ø 4.8 mm	AE 2 (MGB/Wolf)	AL 3 (MGB/Wolf)
	402-11510	3.0 m	Ø 4.8 mm	AE 2 (MGB/Wolf)	AL 3 (MGB/Wolf)
	402-11512	3.0 m	Ø 4.8 mm	AE 6 (Storz)	AL 3 (MGB/Wolf)
	402-11415	2.3 m	Ø 4.8 mm	None	None
	402-11515	3.0 m	Ø 4.8 mm	None	None

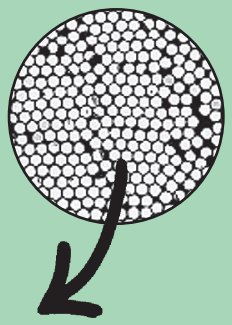
We recommend the High Performance Light Guide *LG 310 W* for the use of Xenon light sources. At the light entry side (connection cable light source) **the fibers are melted together** resulting in higher resistance towards heat and better transmission compared with a conventional light guide. Special marking: during using, the sleeve on the side of the light source will light



High Performance

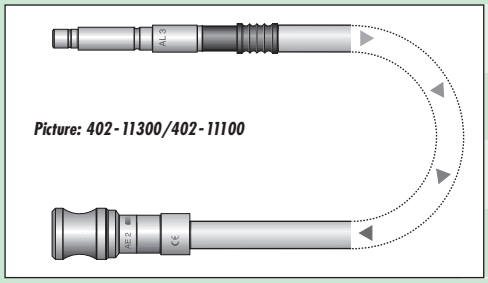
The fibers are melted together resulting in higher resistance towards heat and more transmission.

Conventional Light



STANDARD LIGHT GUIDE LG 200

Product	*Order-No.*	*Length*	*Cable*	*AE (Adapter endoscope side)*	*AL (Adapter light-source side)*
	402-11300	2.3 m	Ø 4.8 mm	AE 2 (MGB/Wolf)	AL 3 (MGB/Wolf)
	402-11100	3.0 m	Ø 4.8 mm	AE 2 (MGB/Wolf)	AL 3 (MGB/Wolf)
	402-11310	2.3 m	Ø 4.8 mm	AE 6 (Storz)	AL 7 (Storz)
	402-11305	2.3 m	Ø 4.8 mm	None	None
	402-11105	3.0 m	Ø 4.8 mm	None	None
	402-11000	1.8 m	Ø 3.5 mm	AE 2 (MGB/Wolf)	AL 3 (MGB/Wolf)
	402-11010	1.8 m	Ø 3.5 mm	AE 6 (Storz)	AL 7 (Storz)
	402-11005	1.8 m	Ø 3.5 mm	None	None

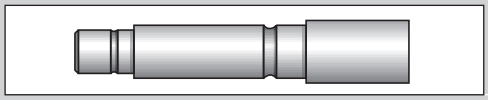
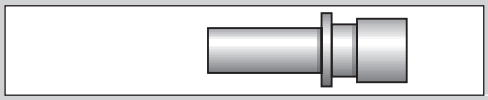
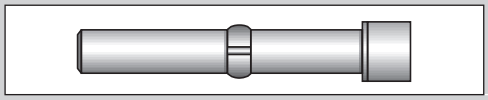
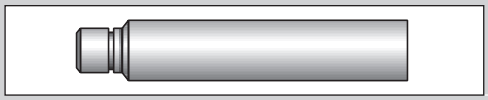
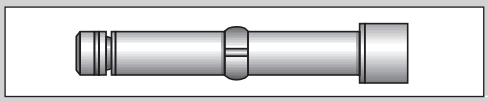
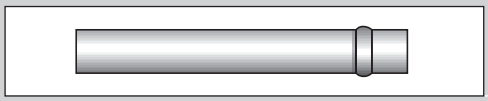
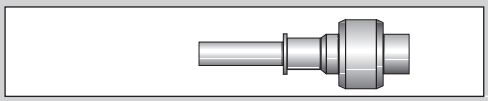


Picture: 402-11300/402-11100

The Standard Light Guide *LG 200* is suitable for Halogen light sources and 180 W Xenon light sources; the ends are bonded with special adhesive. Our light guides are available with or without adapters.

MGB

ADAPTER LIGHT SOURCE SIDE (AL)

Product	Order-No.	Description	Light Source Side with Connection
	402-00050	AL 3	MGB/Wolf
	402-00042	AL 7	Storz/Aesculap
	402-00033	AL 8	Olympus
	402-00101	AL 9	ACMI
	402-00104	AL 10	Olympus/ACMI
	402-00102	AL 11	Pentax
	402-00034		Solos

ADAPTER ENDOSCOPE SIDE (AE)

Product	Order-No.	Description	Light Source Side with Connection
	402-00051	AE 2	MGB/Wolf
	402-00015	AE 4	MGB/old MGB-telescopes
	402-00005	AE 5	MGB
	402-00052	AE 6	Storz/Olympus/Aesculap/WISAP
	402-00103	AE 9	ACMI/CIRCON

ME-GX INSUFFLATOR

Order-No.: 670-95700

Specification

Up to user's choice operating in continuous or intermittent mode ensures suitability for any endoscopic application.

High Safety

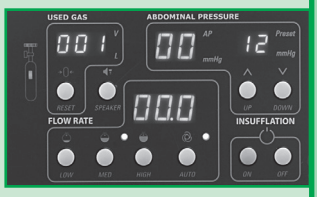
Safety is more important than any other performance. Multi-level safety and protection is provided by a combination of digital control and mechanical technology. High or low input gas pressure and accurate CO_2 gas flow rate are monitored and verified all the time.

Compatibility

ME-GX is compatible to central CO_2 or different kind of gas bottles.

Superior Price/Performance Ratio

This device covers all the basic needs for Laparoscopic procedures while it is available for a very attractive price.



Control

Easy operation as you are used to from our ML-G.

GENERAL

Order-No.	
670-95700	ME-GX Insufflator
Main Connection	
Power supply	100 - 240 VAC
Frequency	50/60 Hz
Power consumption	25 VA (max.)
Fuse	2 x T 1.0 AL/250 V
Classification	
Safety class	1 with potential equalization connection
Type	BF
Approval	CE
Dimension and Weight	
Dimension (w x d x h)	380 x 340 x 120 mm
Weight	8.7 kg
Operating Conditions	
Operating temperature	+10°C to +40°C
Operating humidity	30% to 75% RH
Extend of Delivery	
ME-GX	■ Silicone tube set for insufflation ■ Disposable filter for insufflation ■ Adapter for insufflation ■ Power cable ■ User manual
Interface	
To patient	Gas connection: Conus
CO_2 connection	■ DIN

SPECIFICATION

Main Unit	
Insufflation medium: CO_2 Insufflation rate	■ Low: approx. 2 l/min ■ Med: approx. 10 l/min ■ High: approx. 30 l/min ■ Auto: continuous flow
Intra-abdominal working pressure	■ Adjustable in the range of 3 ~ 30 mmHG continuously ■ Maximum pressure of bottle: 100 bar ■ Display of critical low bottle pressure

Order-No.	*Accessories*
670-95300	Silicone tube set for insufflation
670-95310	CO_2 gas bottle 1l (empty)
670-95311	Key for CO_2 gas bottle connection
670-95313	High pressure tube, GI:DIN, bottle:DIN
670-95314	High pressure tube, GI:DIN, bottle:PIN
670-95316	High pressure tube, GI:DIN, bottle:ITALY
See Laparoscopic folder	Verres needle, different lengths
675-11200	Filter for insufflation, conus 15 mm, 25 pcs.
675-11202	Adaptor for insufflation

MGB

ML-GX INSUFFLATOR

Order-No.: 670-95900

Specification

Up to user's choice operating in continuous or intermittent mode ensures suitability to any endoscopic application. Additional irrigation function and optional heating complete this device.

High Safety

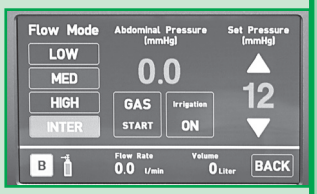
Safety is more important than any other performance. Multi-level safety and protection is provided by a combinationof digital control and mechanical technology. High or low input gas pressure and accurate CO_2 gas flow rate are monitored and verified all the time.

Clear Arrangement

Simple operation either by integrated LCD touch screen or Jog-Dial. Individual user setting storage allows quick access to the adjustments that best fit your needs.

Compatibility

ML-GX is compatible to central CO_2 or different kind of gas bottles.

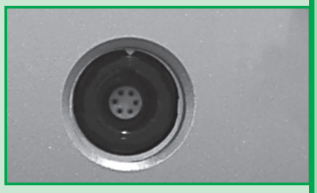


LCD Touch Screen

Allows easy operation and individual user setting storage.

Irrigation included

The ML-GX has a gas pressure irrigation function, which allows liquids irrigation. In combination with the MGB Suction-/ Irrigation instrument, simple handling and high flow irrigation is guaranteed.



Heating

CO_2 preheating allows longer surgery.

MGB

GENERAL

Order-No.	
670-95900	ML-GX Insufflator
Main Connection	
Power supply	100 – 240 VAC
Frequency	50/60 Hz
Power consumption	80 VA (max.)
Fuse	2 x T 1.0 AL/250 V
Classification	
Safety class	1 with potential equalization connection
Type	BF
Approval	CE
Dimension and Weight	
Dimension (w x d x h)	380 x 330 x 100 mm (without gas bottle)
Weight	11.5 kg
Operating Conditions	
Operating temperature	+10°C ~ +40°C
Operating humidity	30% ~ 75%
Extend of Delivery	
ML-GX	■ Silicone heating tube set for insufflation ■ Disposable filter for insufflation ■ Adapter for insufflation ■ Silicone tube set for irrigation ■ Power cable ■ User manual
Interface	
To patient	Gas connection: Conus
CO_2 connection	■ Irrigation connection: Luer (male) ■ DIN

SPECIFICATION

Main Unit	
Insufflation medium: CO_2 Insufflation rate	■ Low: adjustable from 1 to 45 l/min (preset: 2 l/min.) ■ Med: adjustable from 1 to 45 l/min (preset: 8 l/min.) ■ High: adjustable from 1 to 45 l/min (preset: 40 l/min.) ■ Automatic flow profile depens on Low, Med and High flow rate setting ■ Intermittent or continuous flow mode
Intra-abdominal working pressure	■ Adjustable in the range of 3 ~ 30 mmHG ■ Maximal pressure of bottle: 100 bar

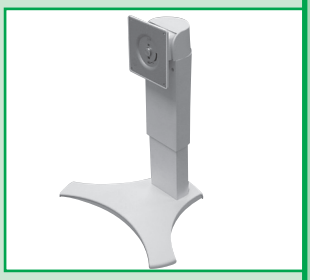
Order-No.	*Accessories*
670-95910	Heating tube
670-95300	Silicone tube set for insufflation
670-95310	CO_2 gas bottle 1l (empty)
670-95311	Key for CO_2 gas bottle connection
670-95313	High pressure tube, GI:DIN, bottle:DIN
670-95314	High pressure tube, GI:DIN, bottle:PIN
670-95316	High pressure tube, GI:DIN, bottle:ITALY
See Laparoscopic folder	Verres needle, different lengths
675-11200	Filter for insufflation, conus 15 mm, 25 pcs.
675-11202	Adaptor for insufflation
670-95301	Silicone tube set for irrigation
670-96330	Irrigation trocar, short (0.5 l)
670-96331	Irrigation trocar, long (1.0 l)
670-96325	Irrigation bottle holder for cart
670-95310	Filter for irrigation, 10 pcs.

AMM240WTD 24" FULL HD-MONITOR

Order-No. 470-43200

AMM213TD

21,3" HD-Monitor,
Order-No. 470-43300



Base Stand
Order-No. 470-43210

Product Line

The new MGB monitors cover all the needs in the endoscopic field. The 21.3" HD-monitor is recommend for the use with our MS-V and ML-V cameras while the HD 24" monitor is intended for the use with our ML-VHD HD-camera.

Medical Grade

All monitors are sealed to ensure proper cleaning. In addition, each model also features Seolforbio TechnologyTM which provides an internal anti-bacterial coating for added protection.

Flexibility

Each model can easily be mounted on a wall, ceiling or an extended arm (VESA compliance) as well as put on a cart by using its optional base stand.

Multiple Pictures Modes

The AMM213TD and the AMM240WTD support true Picture-in-Picture (PIP), Picture-on-Picture (POP) and Picture-by-Picture (PBP) Mode with independent adjustment. These flexible display modes can be used for special applications such as to view both live video and captured images simultaneously for more comprehensive coverage of the surgical procedure.

Easy Control

The user friendly On-Screen-Display (OSD) allows easy adjustment of the settings. The new Jog-Dial control of the AMM214TD and the AMM240WTD makes the control even easier.

MGB

Product	AMM213TD	AMM240WTD
Order-No.	470-43300	470-43200
Picture Performance		
LCD Panel	21,3" TFT Panel	24" TFT Panel
Resolution	1600 x 1200 dots	1920 x 1200 dots
Aspects	4:3	16:10
Colors	16.7 M	16.7 M
Brightness	750 cd/m²	400 cd/m²
Contrast Ratio	1100:1	1000:1
Viewing Angle	+/- 85° (H), +/- 85° (V)	+/- 85° (H), +/- 85° (V)
Input/Output		
Input	■ DVI-I ■ HD 15 ■ SD/HD-SDI 1 and 2 ■ Component (YPbPr) ■ C-Video ■ S-Video	■ DVI ■ HD 15 ■ SD/HD-SDI 1 and 2 ■ Component (YPbPr) ■ C-Video ■ S-Video
Input (Loop Through)	■ SD/HD-SDI ■ Component (YPbPr) ■ C-Video ■ S-Video	■ SD/HD-SDI ■ Component (YPbPr) ■ C-Video ■ S-Video
Remote	DB-9 (RS 232)	DB-9 (RS 232)
Operating/Storage Environment		
Operating Temperature	10 ~ 40°C (50 ~ 104 °F)	10 ~ 40°C (50 ~ 104 °F)
Storage Temperature	-20 ~ 60°C (-4 ~ 140 °F)	-20 ~ 60°C (-4 ~ 140 °F)
Humidity	30 ~ 75 % (no condensation)	30 ~ 75 % (no condensation)
Operating Pressure	700 ~ 1060 hPa	700 ~ 1060 hPa
Dimension & Weight		
Dimension in cm (w x h x d)	512 x 389 x 85	598 x 382.9 x 111.5
Dimension in inches (w x h x d)	20.0 x 15.31 x 3.3	23.54 x 15.07 x 4.39
Weight in kg [lb]	6.66 kg [14.65 lb]	7.47 kg [16.45 lb]
Power Source		
Display Monitor	DC 24 V	DC 24 V
AC-Adapter	AC 100 ~ 240 V, 50/60 Hz	AC 100 ~ 240 V, 50/60 Hz
Regulations		
Safety, AMY & Environmental	■ UL 60601-1 ■ EN 60601-1 ■ EN 60601-1-2 ■ FCC ■ CE ■ CCC ■ VCCI ■ RoHS ■ IP X 1 Comliance	■ UL 60601-1 ■ EN 60601-1 ■ EN 60601-1-2 ■ FCC ■ CE ■ CCC ■ VCCI ■ RoHS ■ IP X 1 Comliance
Accessories		
Standard	■ AC Power Cord ■ AC-Adapter ■ Video Cables ■ User Manual	■ AC Power Cord ■ AC-Adapter ■ Video Cables ■ User Manual
Options	■ Base Stand *(Order-No. 470-43210)*	■ Base Stand *(Order-No. 470-43210)*

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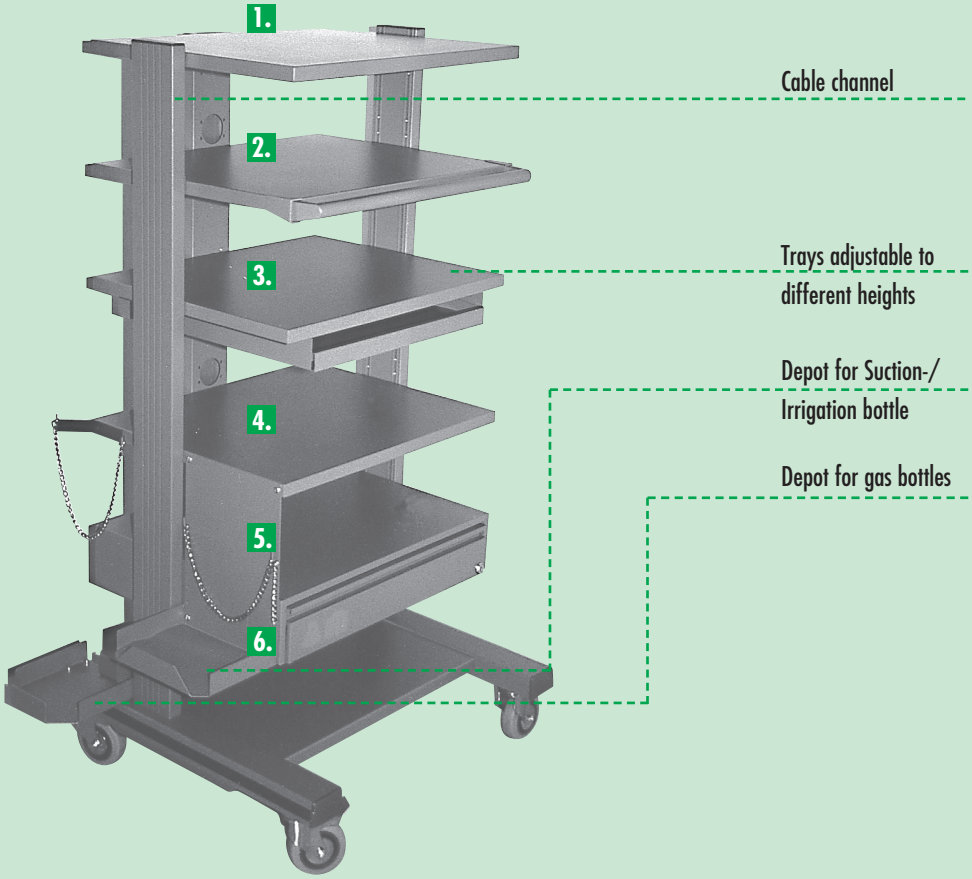
ENDO-CART EC-2000 A

Order-No.: 670-80610



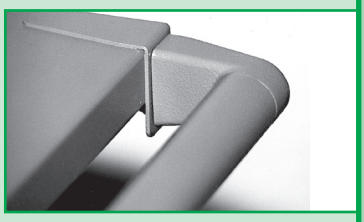
Intended Use

- Large cable channel with potential equalization pins and cover
- Gliding wheels with locking brakes
- Surface: metal-powder coating, easy-cleaning, resistant to disinfecting agents
- Dimension (w/h/d): 1390 mm x 710 mm x 700 mm
- Distance between stands: 185 mm
- Space for units (w/d): 600 mm x 480 mm
- Weight: 57 kg
- Stand for gas bottle: 180 mm x 190 mm
- Stand for Suction-/Irrigation bottle: 225 mm x 180 mm

Stable Construction

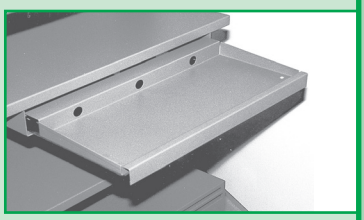
Example Laparoscopy/Load Capacity:

1. Monitor (35 kg)
2. Light source/Camera (20 kg)
3. Insufflator (20 kg)
4. HF-Generator or Suction-/Irrigation unit (20 kg)
5. Recorder/Printer (20 kg)
6. Isolation Transformer (35 kg)



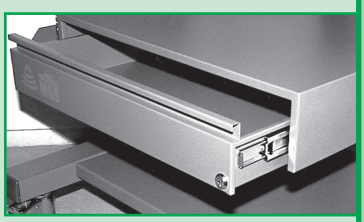
Handle for Moving

Controllable positioning and moving of Endo-Cart.



Special Tray for Keyboard

Pull-out tray for keyboard and storage.



Lockable Drawer

Large sliding drawer (inside depth 100 mm) for storage of documents and camera.

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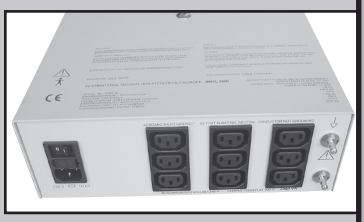
ISOLATION TRANSFORMER

Order-No.: 670-80200

Isolation Transformer

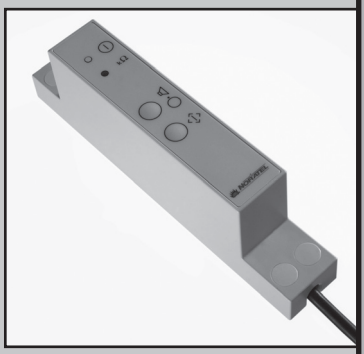
Special isolating transformer for medical application in an attractive white finish aluminum enclosure. The power entry module contains a power switch, green LED (when "on"), line filter for medical use and dual current limiting fuses. Double insulated windings ensure a galvanic physical separation between input and output as well as holding the leakage current below the stipulated maximum value.



Isolation Transformer

Earth Leakage Guard

The Earth-Leakage Guard ELG controls the dielectric resistance between the phase conductor against ground. Due to the galvanic separation caused by the isolating transformer, the monitoring of the IT system is absent. The Earth-Leakage Guard ELG eliminatesthis securitiy vulnerability.
The Earth-Leakage Guard ELG is a separate monitor and indicator unit.
The connection oft he ELG to the isolating transformer is done simply by plugging into one of the outlets.
The ELG conforms to the EN 60601-1 and the EC-guidlines MDD93/42/EWG.



Earth-Leakage Guard

Technical Specification	
Input voltage	230 VAC
Frequency	50 - 60 Hz
Power	2000 VA
Output voltage	230 VAC
No. of outlets	9 x IEC 320
Leakage current	max. 70 µA
According to	EN 60601-1/EN60601-1-1/ EN 14971/EG93/42/EWG
Test/insulating voltage	4 kV AC RMS
Construction class	1
Insulation class	B (130°C)
Ambient temperature (t_a)	25°C
Degree of protection	IP 21
Dimension (l x w x h)	312 x 286 x 103 mm
Weight	21 kg

Typical Application

Very high requirements for extremely low leakage current, as well as the reduction of the leakage current of several units combined – for the hospital environment.

Typical applications include installations of an endoscopic set:

- Monitor
- Light Source
- Insufflator
- HF-Generator
- Suction-/Irrigation unit
- Recorder/Printer
- Etc.

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